

**REMARKS**

Claims 1-8 are pending. Claims 4-6 were previously withdrawn. Independent claim 1 and dependent claim 7 are currently amended. The amendments to the claims have been made for purposes of clarification and without adding new matter. Claim 1 is currently amended to delete the limitation that the organophosphorus compound is not substantially copolymerizable with a (meth)acrylic monomer, and to include a limitation to the (meth)acrylic polymer containing 0-0.7% by weight phosphorus, and to clarify that the composition includes the hydrated metal compound in an amount of 48-60 vol% of the total volume of the composition. Dependent claim 7 is currently amended to include limitations that the (meth)acrylic polymer has a phosphorus content of 0.4% by weight of the (meth)acrylic polymer, and the composition includes the hydrated metal compound in an amount of 60 vol%.

Support for the amendments to independent claims 1 and 7 may be found, for example, in Applicant's specification at page 5, line 31 through page 6, line 1 ("In other embodiments, the amount of the hydrated metal compound is in the range of 45-80 vol%, and **48-60 vol%**, of the total volume of the composition constituting the resulting thermally conductive sheet.") (*emphasis added*), and in Tables I-II, Example 4 (Table I shows the **phosphorus content of the binder is 0.4% by weight**, and the **aluminum hydroxide comprises 60% by volume of the composition**), and Examples 15-16 (Table II shows the **phosphorus content of the binder is 0% by weight**, and the **aluminum hydroxide comprises 50% by volume of the composition**) (*emphasis added*).

Applicant notes in particular that Applicant's Example 4 (Table I) discloses use of a (meth)acrylic polymer (e.g. partially polymerized polymer (page 14, lines 9-16 and Table 2) having a phosphorus content of 0.4% by weight with 60% by volume of the composition of aluminum hydroxide (i.e. an exemplary hydrated metal compound), in conjunction with 5 weight percent MR260 (described at page 18, line 5 as diphenyl-2-methacryloyloxyethyl phosphate), which is an organophosphorus compound falling within the elected species of Group I. Applicant respectfully directs the Examiner's attention to the fact that dependent claim 7 has been currently amended to correspond to the precise phosphorus content of the binder and the

precise aluminum hydroxide (i.e. an exemplary hydrated metal compound) volume percent of the composition corresponding to Applicant's Example 4.

Furthermore, Applicant notes that Example 5 (Table I) provides an embodiment including a (meth)acrylic polymer (e.g. partially polymerized polymer (page 14, lines 9-16 and Table 2) having a phosphorus content of 0.8% by weight with 60% by volume of the composition of a hydrated metal compound (30% by volume B703T treated aluminum hydroxide, and 30% by volume N4 treated magnesium hydroxide) and including 10 weight percent of an organophosphorus compound falling within the elected species of Group I (i.e. MR260).

Additionally, Comparative Example 2 discloses use of a (meth)acrylic polymer (e.g. partially polymerized polymer (page 14, lines 9-16 and Table 2) having a phosphorus content of 0.4% by weight with 35% by volume of the composition of aluminum hydroxide (i.e. an exemplary hydrated metal compound), in conjunction with 10 weight percent MR260 (described at page 18, line 5 as diphenyl-2-methacryloyloxyethyl phosphate), which is an organophosphorus compound falling within the elected species of Group I.

Therefore, Applicant respectfully submits that Examples 4-5 and Comparative Example 2 provide direct support for a (meth)acrylic polymer having a phosphorus content of 0-0.7% and a working range of volume percent aluminum hydroxide as extending from greater than 35 percent by volume to 60 percent by volume for embodiments including an organophosphorus compound of the elected species of Group I. Thus, Applicant respectfully submits that the cited passages of Applicant's specification, particularly when viewed in light of Applicant's disclosed Examples, clearly established that Applicant had possession of the presently claimed invention at the time the application was filed. Thus, Applicant respectfully submits that the amendments to claims 1 and 7 are fully supported by Applicant's specification and comply with the written description requirement under 35 U.S.C. § 112, first paragraph.<sup>1</sup>

Applicant believes that the Amendment places the application in condition for allowance, or alternatively, in better position for appeal. Applicant respectfully requests entry of the present

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<sup>1</sup> See *Ex parte Holt*, 19 USPQ2d 1211 (BPAI, 1991) ("an invention claimed need not be described *ipsis verbis* in the specification in order to satisfy the disclosure requirements of 35 U.S.C. § 112").

Amendment. After this Amendment, claims 1-8 remain pending. Applicant respectfully requests reconsideration and prompt allowance of all pending claims, in view of the following arguments.

**Rejections under 35 U.S.C. § 112**

Claim 7 stands rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. The Patent Office alleges that the claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Claim 7 recites “phosphorus content greater than 0% and not greater than 5.2% by weight of the (meth)acrylic polymer”. The Patent Office admitted, in the Office Action dated December 12, 2009, that there is support for the recited phosphorus content in the (meth)acrylic polymer used to form a thermally conductive sheet containing 45, 50 and 60 parts by volume of hydrated compound.

Applicant has presently amended independent claim 1 to include a limitation to the (meth)acrylic polymer containing less than 0.7% by weight phosphorus, and to clarify that the composition includes the hydrated metal compound in an amount of 48-60 vol% of the total volume of the composition. Applicant has also amended dependent claim 7 to read that the (meth)acrylic polymer has a phosphorus content of 0.4% by weight of the (meth)acrylic polymer, and the composition includes the hydrated metal compound in an amount of 60 vol%. Applicant respectfully contends that the present amendments to claims 1 and 7 render moot the grounds of rejection of claim 7 for alleged failure to comply with the written description requirement. In summary, Applicant respectfully submits that the rejection of claim 7 under 35 U.S.C. § 112, first paragraph, has been overcome, and that the rejection should be withdrawn.

**Rejection under 35 U.S.C. § 103**

Claims 1-3, 7 and 8 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious and unpatentable over Yamazaki et al. (JP 2000-313785). In the Office Action dated December 12, 2008, The Patent Office alleges:

Yamazaki et al disclose a resin composition for fire-resistant molding materials suitably used as a sheet (paragraph 0001). The flame retardant molding material comprises a radically polymerizable resin containing aluminum hydroxide and phosphoric ester methacrylate, wherein the phosphorus content in the radical polymerizable resin is 0.7-10 wt% to overall radical polymerizable resin (paragraph 0007). Other compounds that are copolymerizable with phosphoric ester methacrylate can be included (paragraph 0023). Examples of copolymerizable monomers include styrene, methyl (meth)acrylate, ethyl (meth)acrylate (paragraph 0025). The phosphoric ester (meth)acrylate is present in 5-80% by weight of the resin and it is desirable that the other copolymerizable monomer is present in an amount of 20-95% by weight. It is desirable to use 100-300 parts by weight of aluminum hydroxide to 100 parts of the resin (paragraph 0028) and reads on the vol% of metal hydroxide of claim 1. Furthermore, when the aluminum hydroxide content is more than 300 parts by weight relative to 100 parts by weight of radically polymerizable resin, molding performance properties such as flexibility may be poor i.e., Yamazaki et al recognize the importance of flexibility accorded to molded products (paragraph 0028). The fire retardant molding composition of the present invention is suitable for materials for moldings requiring good fire resistance such as sheets (paragraph 0034). See example 1, where in the product is compounded with mono(2-methacryloyloxyethyl) acid phosphate and di(2-methacryloyloxy) acid phosphate to obtain a radical polymerizable resin.

However, Yamazaki et al in the general disclosure teach that for further enhanced fire retardance of molded products, the fire retardant molding resin composition may be compounded with fire retardants. Any fire retardants commonly used for fire retardant molding resin may be used and include halogen free retardants such as phosphoric acid esters exemplified by triphenyl phosphate, cresyl diphenyl phosphate and resorcinal diphenyl phosphate (paragraph 0032). Therefore, it would have been obvious to one skilled in the art at the time of invention to add phosphoric acid ester fire retardants, such as triphenyl phosphate, cresyl diphenyl phosphate and resorcinal diphenyl phosphate, not substantially copolymerizable with a (meth)acrylic monomer, to the composition used to form flame retardant sheets because Yamazaki et al contemplate adding other fire retardants for further enhanced fire retardance and one of ordinary skill in the art wanting to enhance the fire retardance further would add such a fire retardant to the molding composition used to form the flame retardant sheets, motivated by expectation of success.

Applicant respectfully disagrees with the rejection of claims 1-3, 7 and 8 for alleged obviousness under 35 U.S.C. § 103(a), for at least two reasons. First, Applicant has presently amended independent claim 1, from which claims 2-8 depend, to include a limitation to the (meth)acrylic polymer containing less than 0.7% by weight phosphorus. The Patent Office has admitted (see the above-quoted passage from the Office Action dated December 12, 2008) that Yamazaki discloses only a polymerizable resin comprising 0.7-10% by weight phosphorus. Thus, in view of Applicant's present amendments to the claims, Applicant respectfully submits that Yamazaki et al. has not been shown to disclose, teach or suggest all limitations of Applicant's presently claimed invention, as required to maintain a *prima facie* case of

obviousness.<sup>2</sup> Thus, the rejection of claims 1-3 and 7-8 under 35 U.S.C. § 103(a) as allegedly being obvious over Yamazaki et al. has been overcome and should be withdrawn.

Secondly, Yamazaki et al. **expressly teaches away** from using a polymerizable resin having a phosphorus content less than 0.7% by weight, as Applicant presently claims:

Content of phosphorus atoms in above-described radical polymerizable resin is 0.7 ~ 10 weight % based on total amount of radical polymerizable resin. When it happens to be **under 0.7 weight %, it is not possible to provide a sufficient flame retarding property** to the mold goods, and when it happens to exceed 10 weight %, cost for the resin composition becomes high.<sup>3</sup>

Furthermore, Yamazaki provides a Comparative Example in which the polymerizable resin comprises 0.4 weight % phosphorus (*See Comparative Example 2 of Table 2*), and which is specifically identified as unsuitable because of low flame retardance and therefore teaches away from use of a polymerizable resin comprising only 0.4 weight percent phosphorus:

Regarding (2), as content of phosphorous atoms in comparative radically polymerizable resin is as low as 0.4 weight %, oxygen index show low value to indicate **poor flame retarding property**.<sup>4</sup>

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.”<sup>5</sup> Applicant respectfully contends that Yamazaki et al. **expressly teaches away** from using a polymerizable resin having a phosphorus content less than 0.7% by weight, as Applicant presently claims. Thus, Applicant respectfully submits that one of ordinary skill in the art, upon reading the entire disclosure of Yamazaki et al., would not have been properly motivated to use a polymerizable resin having a phosphorus content less than 0.7% by weight, as Applicant presently claims. For at least this reason, the rejection of claims 1-3, 7 and 8 for alleged obviousness under 35 U.S.C. § 103(a) is improper, and should be withdrawn.

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<sup>2</sup> See *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 231 USPQ 81 (Fed. Cir. 1986).

<sup>3</sup> Yamazaki et al. (JP 2000-313785), ¶ [0009] (*Emphasis added*).

<sup>4</sup> *Id.*, ¶ [0047] (*Emphasis added*).

<sup>5</sup> *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); *Para-Ordnance Mfg. v. SGS Importers Int'l*, 73 F.3d 1085, 1090 (Fed. Cir. 1995).

**CONCLUSION**

Applicant respectfully requests entry of the Amendment and reconsideration of the application in light of the foregoing Amendment. Withdrawal of the rejections of claims 1-3, and 7-8 under 35 U.S.C. § 103(a) as allegedly being obvious and unpatentable over Yamazaki et al. is respectfully requested. Withdrawal of the rejection of claim 7 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement, is also respectfully requested.

Applicant respectfully submits that if claim 1 is found allowable with respect to elected species I, then at least claims 2-8 should also be allowed with respect to the non-elected species, since claim 1 is generic, and claims 2-8 are dependent from claim 1 and incorporate all limitations found therein. Applicant respectfully requests examination and rejoinder of claims 4-6 under 37 CFR 1.104, as requiring all limitations of allowable independent claim 1. Based on the foregoing, it is submitted that the application is in condition for allowance. Allowance of all pending claims at an early date is solicited. The Examiner is invited to contact Applicant's attorney if the Examiner believes any questions or issues remain.

Respectfully submitted,

February 12, 2009  
Date

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